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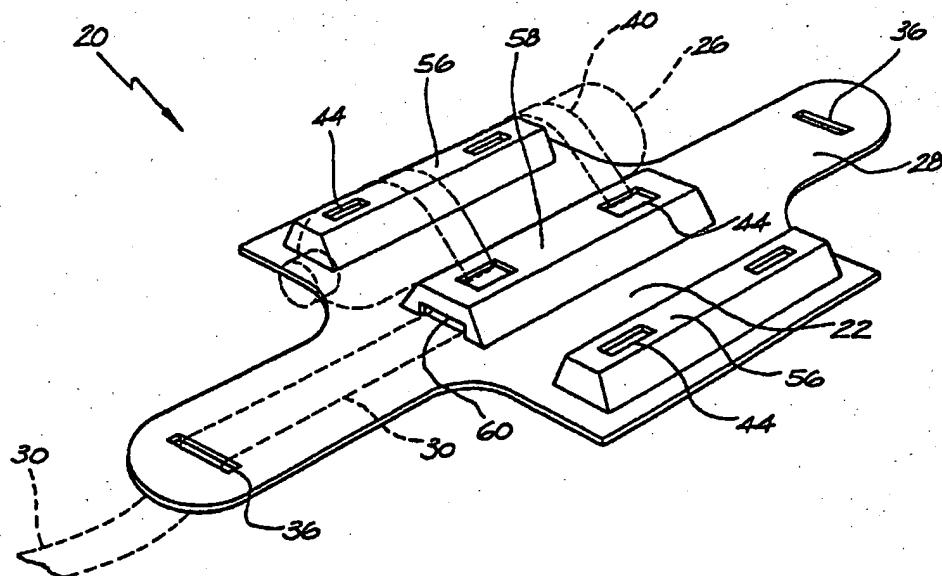


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(54) Title: A BELT



(57) Abstract

A belt (20) for bearing one or more containers (26) is defined. The belt comprises one or more bearing regions (22) arranged on a support (28). The or each region includes a recess means that is adapted for receiving and releasably holding a respective container therein. The belt also comprises fixing means (30) extending from the support for fastening the support to a user of the belt. In use the belt is adapted so that the support can be positioned on the user's back at or adjacent the waist.

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A BELTTECHNICAL FIELD

The present invention relates to a belt for bearing one or more containers, and in particular to a belt for bearing compact air containers to be carried by a human user of the belt for use on land and in and underwater. The invention will in part be hereafter described in relation to use with compact air containers, however, it is to be appreciated that the invention is not limited to this field of use.

BACKGROUND ART

Existing container carrying systems, typically known as "packs" are designed for the carrying of large air containers or tanks, are bulky and are therefore mounted on the back of a user. A pack is attached to the user by straps hanging over the shoulders and the tanks are mounted in a vertical orientation. Packs are used by both career and recreational divers and rescue and other types of emergency personnel.

Typically, packs tend to be heavy, cumbersome and severely restrict the mobility of a user. However, the packs have not been altered because they have been designed for a standard tank size and this limits constructional variation.

The heavy and cumbersome construction of existing packs becomes critical in emergency situations, especially where the user wearing the pack is in a tight or restricted area or must lift and carry an injured victim, or carry additional air supply, water, etc. to the site of an emergency. Existing packs also generally require an extra person to assist in loading the pack onto a user and the packs take up considerable storage space when not in use.

DISCLOSURE OF THE INVENTION

The present invention provides a belt for bearing one or more containers, the belt comprising one or more bearing regions arranged on a support, the or each region including a recess means that is adapted for receiving

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and releasably holding a respective container therein;
and

fixing means extending from the support for
fastening the support to a user of the belt, whereby in
5 use the belt is adapted so that the support can be
positioned on the user's back at or adjacent to the
waist.

Preferably the or each recess means is contoured to
correspond in shape to at least a portion of the external
10 surface of the container to facilitate receipt and
releasable holding of the container therein.

Preferably the recess means in the or each bearing
region is:

15 (a) defined between a plurality of protrusions
arranged in the or each bearing region; and/or

(b) defined by a recess formed in the or each
bearing region relative to the remainder of the support;
and/or

20 (c) formed in one or more protrusions
upstanding relative to the remainder of the support;
and/or

(d) adapted to partially or completely receive
and surround the container therein.

Preferably the or each recess means is adapted to
25 hold a respective longitudinal container in a generally
horizontal or vertical configuration. The recess means
can include straps, leashes etc to facilitate releasable
holding of the container therein.

30 Preferably the or each container is a compact
container. When the term "compact container" is used in
the present specification, it is intended to include the
smaller range of air tanks known as pony or grab bottles,
and also extends to the smaller range of containers
containing other types of fluid, such as fire fighting
35 fluid, pure oxygen, water, etc.

Thus, the belt of the present invention provides an
alternative mode of carrying containers and is
particularly, though not exclusively, adapted for the

easy carrying of compact air tanks. The bulk, weight and utility at least when the belt is used with compact containers is improved over existing packs thereby enhancing a user's mobility and ease of use.

5 It is preferred that the fixing means comprises a pair of straps extending from opposing sides of the support, the free ends of which are fastenable together by a fastening means, which in use can be positioned on a user's front at or adjacent the waist.

10 In one embodiment, the or each recess means can include one or more straps, each of which extends therefrom to surround at least a portion of a respective container for releasably holding it in the recess means in use.

15 Alternatively, the recess means can include one or more receptacles, the or each receptacle being shaped to receive and surround at least a portion of a respective container whereby the or each container is removably held in its respective receptacle.

20 In this regard the or each receptacle may be a cylinder closed at one end and open at the other, which in use is either vertically or horizontally disposed on the support. Preferably the open end of the or each cylinder is provided with a retaining means that in use

25 is adapted to prevent a container from inadvertently sliding out of a cylinder when mounted therein.

The belt can be constructed from various polymers, heavy duty fire retardant plastic, KevlarTM, sheet aluminium (e.g. in segments), stainless steel or other suitable material.

30 Preferably the belt includes a number of additional attachment means for the attaching of various items to the belt.

BRIEF DESCRIPTION OF THE DRAWINGS

35 Notwithstanding any other forms which may fall within the scope of the present invention, preferred embodiments of the invention will now be described, by way of example only, with reference to the accompanying

drawings in which:

Figure 1 is a plan elevation of a belt according to the invention;

5 Figure 2 is a plan elevation of a variation of the belt according to the invention;

Figure 3 is a plan elevation of another variation of the belt according to the invention;

10 Figure 4 is a perspective view of a belt according to the invention;

Figure 5 is a schematic cross-sectional view of examples of various types of retention formations that can be employed on a belt according to the invention;

15 Figure 6 is a cross sectional perspective view of the belt as if taken on the line A-A of Figure 3;

Figure 7 is a cross sectional perspective view as if taken on the line B-B of Figure 2;

20 Figure 8 is a cross sectional perspective view of a further retention formation according to another embodiment of the belt;

Figure 9 is a cross sectional perspective view of another retention formation according to another embodiment of the belt;

25 Figure 10 is an end elevation of a retention formation similar to that shown in Figure 9;

Figure 11 is a perspective view of another retention formation according to another embodiment of the belt;

30 Figures 12 to 16 show perspective views of four different retention formations according to further embodiments of the belt;

Figure 17 shows another type of enclosure retention formation according to another embodiment of the belt;

35 Figures 18 and 19 show plan and perspective views respectively of another type of enclosure retention formation according to another embodiment of the belt;

Figures 20A, 20B and 20C show respectively front, end and plan elevations of a belt according to the invention in use on a user in the horizontal configuration; and

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Figures 21A, 21B, 21C and 21D show respectively front, end, inverted plan and plan views of a belt according to the present invention in use on a user in the vertical configuration.

5

MODES FOR CARRYING OUT THE INVENTION

It is to be noted that like reference numerals will be used throughout the drawings to denote like parts.

Referring to the drawings, in particular Figure 1, a belt is shown in the form of waist pack (20), that 10 comprises a central support region (22) including tank support regions (24). Each tank support region is shaped for receiving a respective tank (26) (the tanks being shown in phantom in the drawing for ease of description).

15 A pair of flexible waist sections (28) extend outwardly from opposing sides of the support region and in use are wrapped around the waist of a user of the waist pack. Extending from each free end of the waist section is a strap (30), and the resultant strap pair is joined together, in use at the front of a user, by a 20 fastening system comprising a male clip (32) and female receiver (34).

In one embodiment, the strap can be a single, continuous strap running along the inside of the waist pack and exiting therefrom at strap slots (36). 25 Alternatively, each strap can be mounted (e.g. riveted, stapled, pinned, etc.) at a free end of a respective waist section to achieve the same result. Each of the straps may also be made adjustable in length for suiting different users of the belt.

30 Each tank is held in its respective tank support region by a pair of tank holdings bands (38). Figure 1 shows two alternative examples of band holding systems that can be employed to hold the tanks to the waist pack, however, other systems could equally well be employed. 35 (e.g. velcro straps, press stud systems, etc.).

Thus, the tank holding bands can comprise a pair of bands (40), (shown joined in Figure 1 for the lower tank). Alternatively the holding bands can be elastic

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straps or rope (42). The tank holding bands may be a continuous strap or rope, extending through respective slots (44). Alternatively, the rope or straps may be mounted (e.g. by riveting, pinning or fastening) to the 5 waist pack itself at appropriate points. Once again, the holding bands can be made adjustable in length for holding different tank sizes.

The waist pack may also be provided with a pair of leashes (only one such leash (46) is shown in Figure 1), 10 for hanging the waist pack on the shoulders of a user. Each leach (46) is attached to the waist pack by a ring at each of its free ends, the leash being attached at loop (48) and slot (50).

With the belt so mounted, the waist sections can 15 then be wrapped around to lie under the arms (i.e. at the armpits) of a user with the straps (30) passing across the chest of the user and the clipping arrangement being fastened together generally in the centre of the chest.

By employing the additional shoulder leach 20 attachment, a user can wear two such waist packs, one at the waist and one at the shoulder region. However, the preferred mode of carrying is in the waist region, as the weight of the tanks is then distributed at the pelvis of a user and thereby the chance of inadvertent back injury 25 is substantially avoided.

The waist pack can also comprise a plurality of slots (52). The slots enable a user to attach tool 30 pouches, knife sheaths, ropes, torches, and other equipment as required, to the waist pack. The equipment attached is generally dependent on the ultimate application of the waist belt. Equipment can also be attached to the waist pack at rings (54), to hang therefrom.

The waist pack can be formed by any suitable 35 process, e.g. injection moulding, blow moulding for a plastic waist pack; forging or pressing for a metal waist pack. As stated above, all of the strap lengths and leash lengths can be made adjustable as can the length of

waist sections (28) and the width of tank support regions (24).

Referring to figure 2 an alternative waist pack is shown with the straps, bands and leashes removed therefrom. In this waist pack, the waist sections (28) are removed; (straps (30) would thus extend from slots (36) virtually completely around a user). The width and resilience of the strap employed with this type of waist pack is changed to provide additional support as a result of the removal of waist sections (28). The remaining features are as per figure 1.

Referring to figure 3, a further embodiment of a waist pack (20) is shown. In this case, the waist pack is adapted for holding a single tank (26) and the central support region (22) is modified accordingly. Once again the waist pack has waist sections (28) for partially wrapping around the waist of a user. The waist pack in figure 3 is shown with the straps, bands and/or leashes removed therefrom for ease of reference. The waist pack of figure 3 can be used in place of, or in addition to the waist pack of figure 1.

Referring to figure 4 a perspective view of a waist pack (20) is shown, not dissimilar to the pack shown in figure 1. The waist pack includes a pair of opposing side flanges (56) projecting upwardly from the support region (22), together with a central flange (58) also projecting upwardly from the support region. A container or cylinder (26) is then mounted to the pack between side flange (56) and the central flange as shown, with the bands (40) extending thereover as shown to hold the tank in place.

Central flange (58) is also provided with a slot (60) for the case whereby strap (30) extends through the waist pack (in figure 4 only half of the strap (30) is shown). Slots (44) are provided in the flanges and the waist pack is then provided with appropriate straps and bands in the same manner as shown in figure 1.

Referring to figure 5, a detail of various support

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region types in cross section is shown. Thus, each tank support region can comprise one of the cross sectional shapes as shown in figure 5. Moving from left to right in figure 5, the tank support regions depicted are a half cylinder, square section, U-shaped, and open trapezium, (so called "Aztec").

Figure 6 is a partial cross-sectional and perspective view taken along the line A-A of figure 3 showing how a half circle formation may be applied with a single tank waist pack. Figure 7 is a partial view taken along the line B-B of figure 2 showing how a square section may be employed for each of the tank support regions (24). Figure 8 is a similar view to that of figure 7, however, an additional tank support region (24) is provided when the waist pack is used to carry three tanks. Additionally, in figure 8 the provision of slot (50), for example for hitching a shoulder leash (e.g. as in figure 1) is shown.

Figure 9, details an alternative waist pack (20). The waist pack is shown with waist sections (28), straps (30) and the clipping arrangement removed therefrom.

The central support region (22) is modified to include a pair of tank receptacles (62). Each receptacle receives a tank (26) in the direction of arrow R and this obviates the need for the tank support region, slot and strap/band configurations as shown in figures 1 to 8.

The receptacles are cylindrical so that the tank is received in a sliding fit therein. At the entrance to each receptacle, a pair of opposing coupling flanges (64) can be provided. The coupling flanges can be formed of a resiliently deformable material, so that the tank side walls engage and compress this material during insertion and removal of the tank from the receptacle. The flanges, however, restore to their original position once the tank has been completely inserted or removed (i.e. so that the head of the tank lies behind the flanges when inserted in the receptacle). The flanges are sized and fabricated so as to prevent inadvertent slipping out of

the tank when inserted in the receptacle, yet allow a user to simply pull the tank out with the application of a given force so that the tank rides over and compressedly deforms the flanges during removal and 5 insertion.

Alternatively an end cap or strapping of some form (not shown) can be arranged over the open end of each receptacle to prevent the container from sliding out of its respective receptacle. The embodiment of figure 9 10 provides a waist pack system which enables rapid loading and unloading of tanks in the waist pack and this factor can be especially advantageous in critical and/or emergency situations.

Figure 10 shows an end view of a similar waist pack 15 as that shown in Figure 9.

Figure 11 shows a T-shaped waist pack. With such a pack, the stem (70) of the pack can be aligned with and along the spine of a user, with one tank resting and being received on protrusions (72) and strapped thereto. 20 The head (74) of the waist pack can then sit horizontally and adjacent to a user's waist. One or two tanks can be received and supported on upstanding and curved recess support (76).

Figures 12 to 15 show four different waist packs, 25 each of which is capable of receiving up to six small tanks (although the waist pack shown in Figure 14 is adapted for receiving three tanks). Tanks can be mounted to these waist packs in a similar manner as shown in Figures 1 to 8. Also, these waist packs can be used in 30 either the horizontal or vertical orientation as required.

Figure 16 shows another waist pack having three bent support frames (80) releasably mounted thereon and detachably receivable at their remote ends to fastening 35 strips (82), (84) (eg. with Velcro^R, pop studs, etc). Tanks are mounted to and supported at bending portions (86) in the support frames (80).

Referring to Figure 17, support strips (90) are

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5 releasably mounted to the waist pack in a similar manner to that described in Figure 16. Each strip includes a pair of rings (92) looped therearound, the rings being adapted for releasably receiving a respective bottle (94) (shown in phantom outline). The rings can be formed of a stiff or resilient material and may deformably engage and fasten against the bottle (94) when loaded therein.

10 Figures 18 and 19 show a further alternative waist pack. The waist pack includes flared cylinder retention holders (101), (102) for receiving tanks or bottles (104). Once again, the cylinders (101), (102) can be stiff or resilient so that they deformably receive the tanks (104) in a releasable fastening arrangement. In addition, the cylinders can incorporate a similar 15 retention system to that described for Figure 9. The waist packs shown in Figures 16 to 19 can be used in the horizontal or vertical orientation depending on preference.

20 Referring to Figures 20 and 21, a waist pack is shown that includes a frame (110), having recesses (112) formed therein for receiving tanks (114). The tanks are retained in the recesses by appropriately arranging straps (116) thereover and as shown. The frame is attached to a user U via belts (118), (120) fastened at 25 the user's front via a buckle or catch (122). In addition, optional shoulder straps (124) can extend from the frame (as shown in Figure 21D).

30 It should be noted that the frame of Figure 20 is slightly modified to the frame of Figure 21. The frame of Figure 20 is adapted for use in the horizontal orientation, whereas the frame of Figure 21 is adapted for use in the vertical orientation.

35 The waist pack is typically formed from flexible polymeric materials, however, the central support region can be formed from a metallic material or comprise a metallic frame upon which a polymeric or fibreglass material is bound, so that the metallic frame provides structural support dependant on the types of

tanks/cylinders used in the waist pack. The waist sections can typically be formed of a flexible material e.g. a polymeric material such as a high density polyethylene, polystyrene, polyurethane, etc. Any of the 5 straps used in the waist pack can be formed from nylon or other synthetic fibre or woven polymeric material with the clips being typically formed from injection moulded plastic. The tank retaining bands (42) can be formed from an elastomeric rubberised material such as a 10 polybutadiene/styrene and/or acrylonitrile copolymer. The support region and additionally the waist sections, straps and bands can all be padded at the regions where they contact a user as appropriate.

15 The tanks or cylinders used with the waist pack are typically standard pony or grab bottles which are frequently used in diving to hold an air supply of twenty (20) minutes each, or may be used for the storage of fire fighting chemicals, water or other compressed gas.

20 As indicated above the waist pack can be provided with moulded metal or plastic rings or hooks (54) for attaching application specific equipment. The waist pack may be fitted with fast release buckles and harnesses, etc., for example when using a shoulder-style mounting. Velcro fastening may be used to fasten the straps to each 25 other or other types of quick release fastening systems such as plastic clipping arrangements, metallic buckles such as used in safety belts, etc. can be used.

30 The waist pack also finds applications with fire departments, airsea rescue, police, and military applications. The waist pack can be used by commercial and sport divers for short use dives. Alternatively, the waist pack can be used by construction workers needing a supply of gas, e.g. for welding purposes whereby the transporting of a commercial welding unit to the 35 application is difficult, cumbersome or dangerous. This is particularly apparent in the construction of high rise buildings whereby a user of the gas supply may find themselves in a precarious position for welding with

conventional equipment.

Whilst the invention has been described with reference to a number of preferred embodiments, it should be appreciated that the invention can be embodied in many other forms.

CLAIMS

1. A belt for bearing one or more containers, the belt comprising one or more bearing regions arranged on a support, the or each region including a recess means that is adapted for receiving and releasably holding a respective container therein; and fixing means extending from the support for fastening the support to a user of the belt, whereby in use the belt is adapted so that the support can be positioned on the user's back at or adjacent the waist.
2. A belt as claimed in claim 1, wherein the or each recess means is contoured to correspond in shape to at least a portion of the external surface of the container to facilitate receipt and releasable holding of the container therein.
3. A belt as claimed in claim 1 or claim 2, wherein the recess means in the or each bearing region is
 - (a) defined between a plurality of protrusions arranged in the or each bearing region; and/or
 - (b) defined by a recess formed in the or each bearing region relative to the remainder of the support; and/or
 - (c) formed in one or more protrusions upstanding relative to the remainder of the support; and/or
 - (d) adapted to partially or completely receive and surround the container therein.
4. A belt as claimed in any one of the preceding claims, wherein the or each recess means is adapted to hold a respective longitudinal container in a generally horizontal or vertical configuration
5. A belt as claimed in any one of the preceding claims, wherein the container is a compact container as

herein defined.

6. A belt as claimed in any one of the preceding claims, wherein the fixing means includes a pair of straps extending from opposing sides of the support, the 5 free ends of which are fastenable together by fastening means, which in use can be positioned on a user's front at or adjacent the waist.
7. A belt as claimed in any one of the preceding claims, wherein the recess means includes one or more 10 receptacles, the or each receptacle being shaped to receive and surround at least a portion of a respective container whereby the or each container is removably held in its respective receptacle.
8. A belt as claimed in claim 7, wherein the or each 15 receptacle is a cylinder closed at one end and open at the other, the open end of the or each cylinder being provided with a retaining means which in use is adapted to prevent the container from inadvertently sliding out of the cylinder when mounted therein.
9. A belt substantially as herein described with 20 reference to the accompanying drawings.

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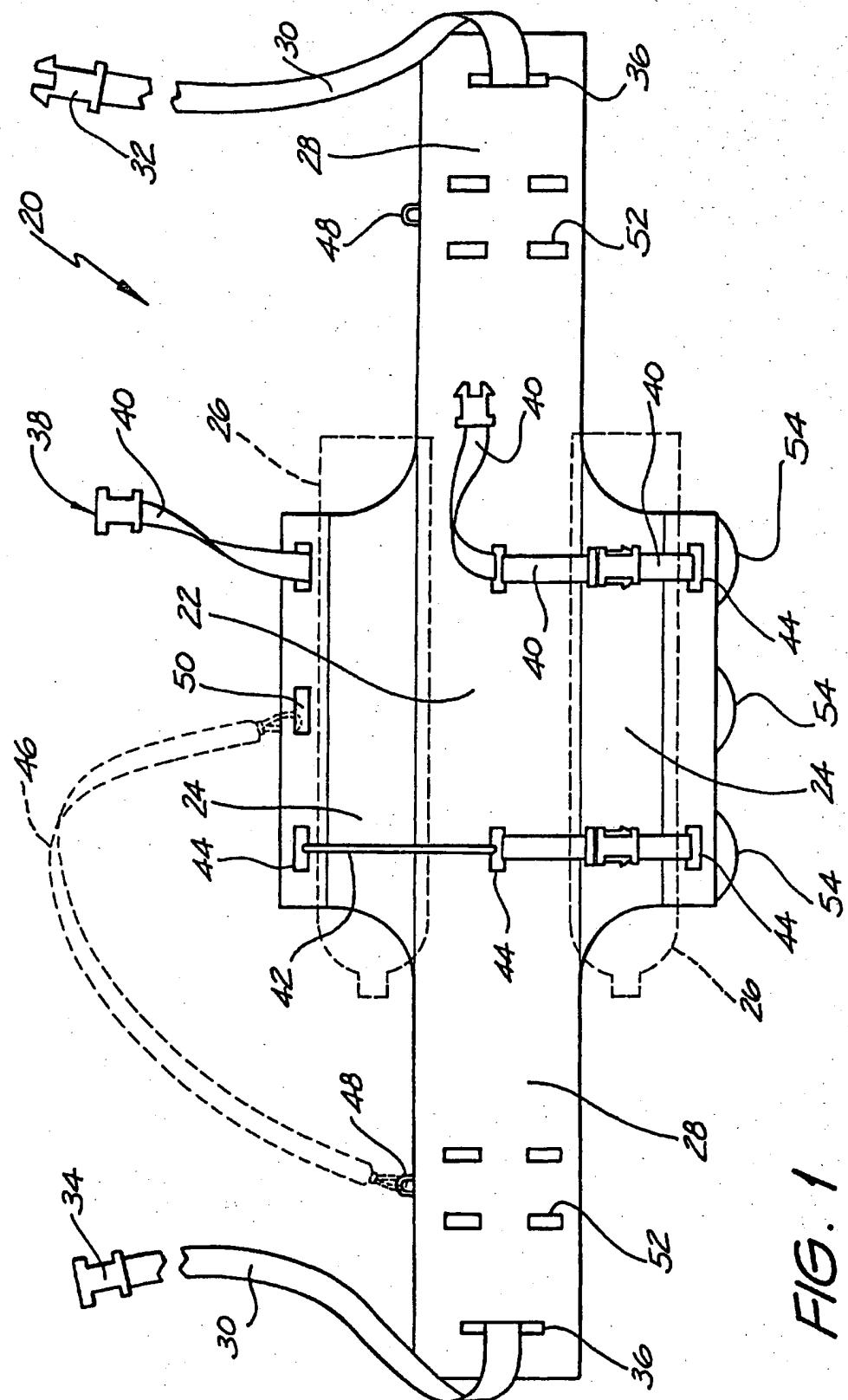


FIG. 1

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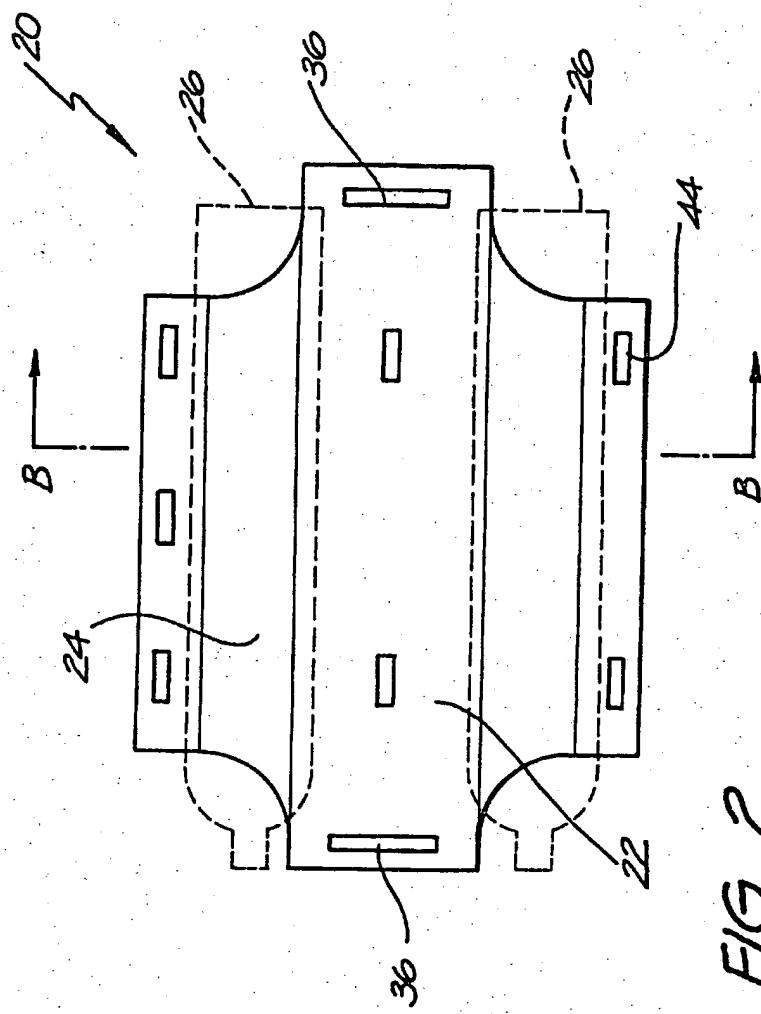


FIG. 2

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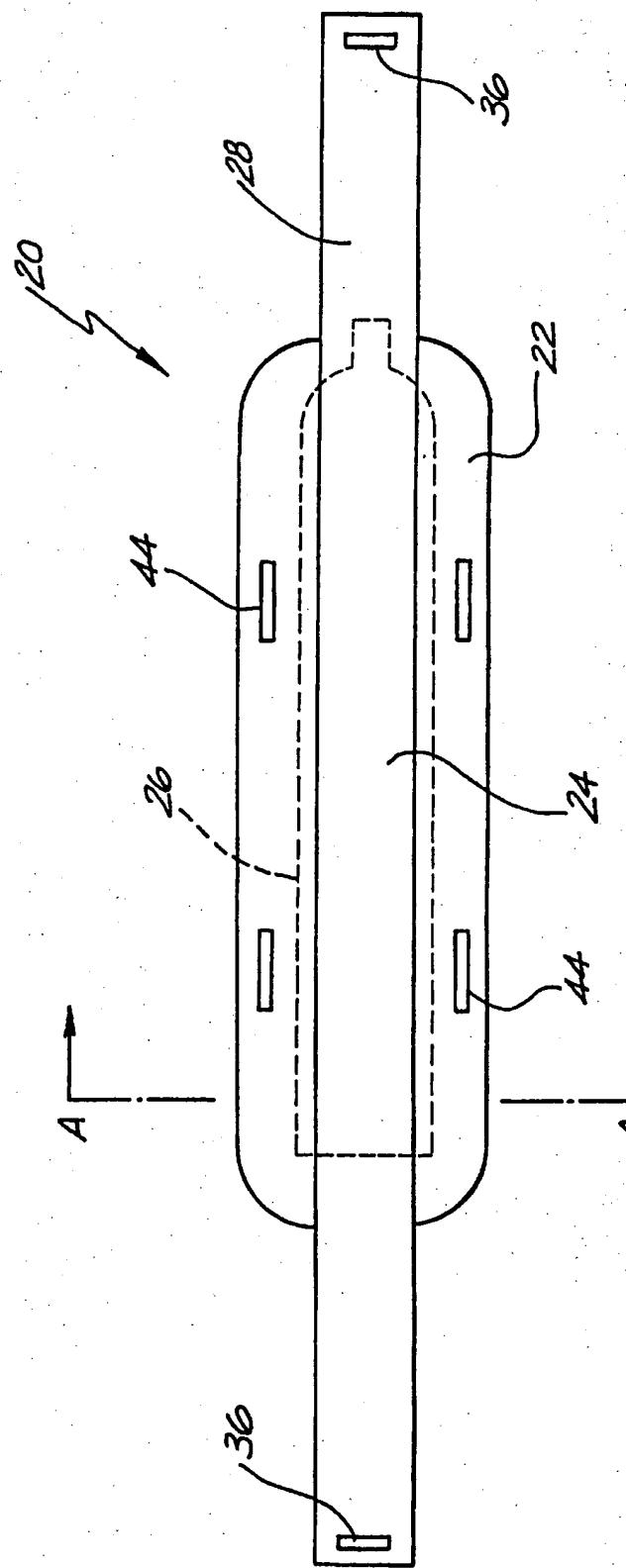


FIG. 3

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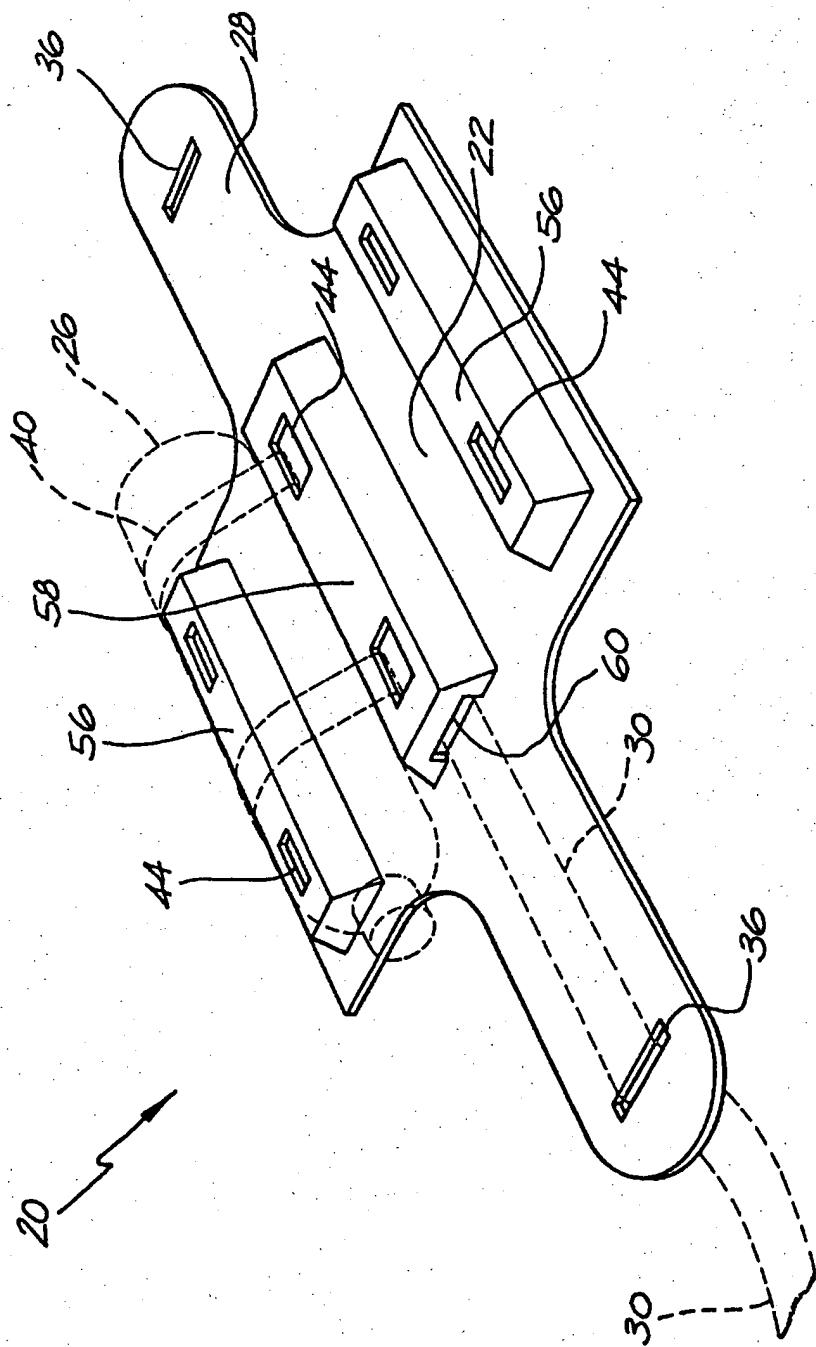


FIG. 4

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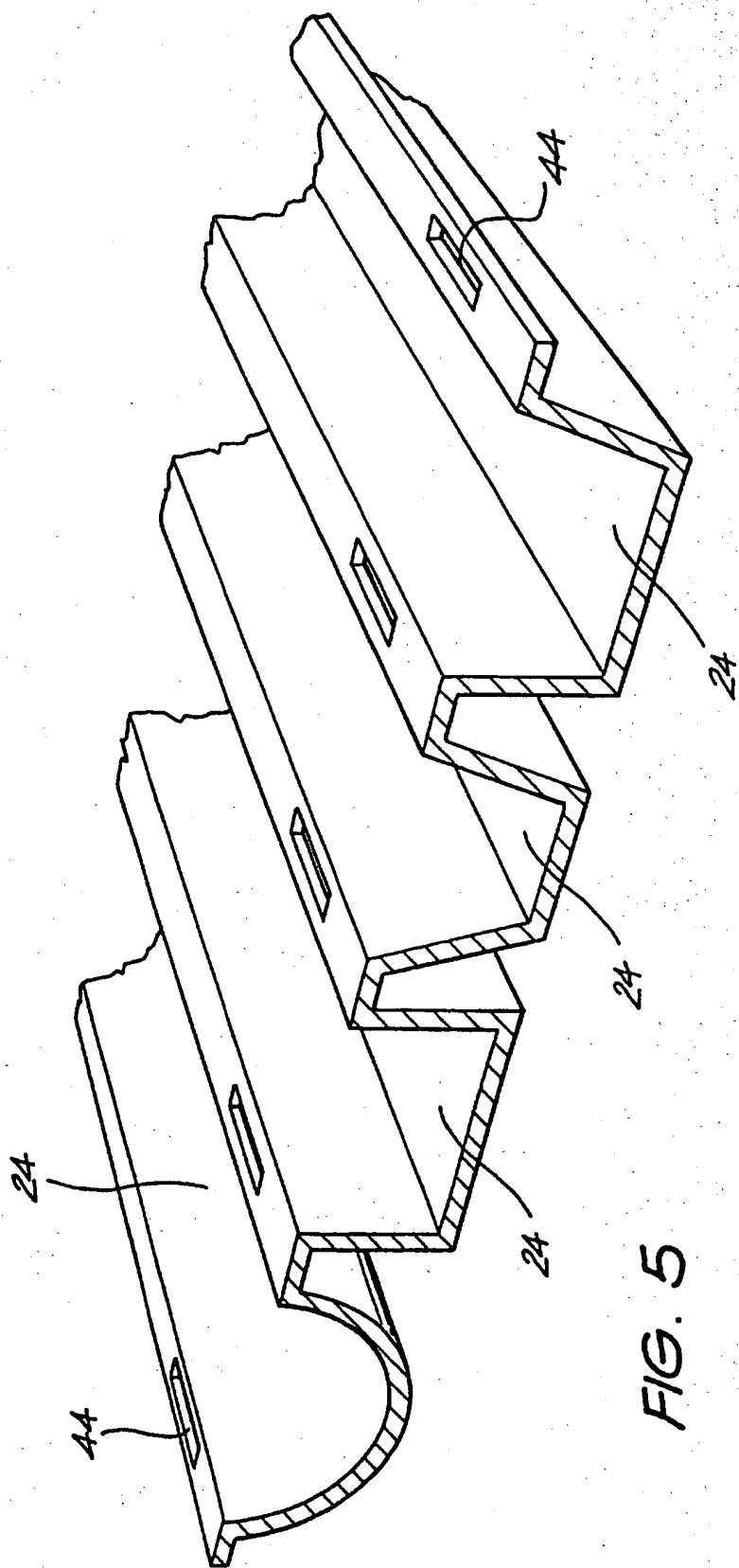


FIG. 5

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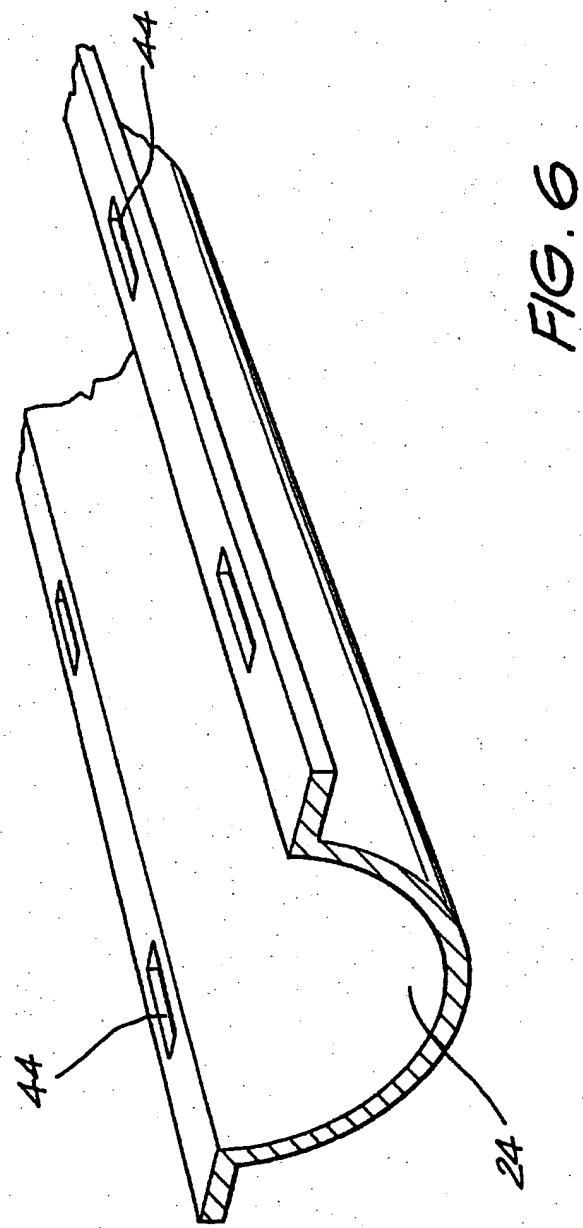
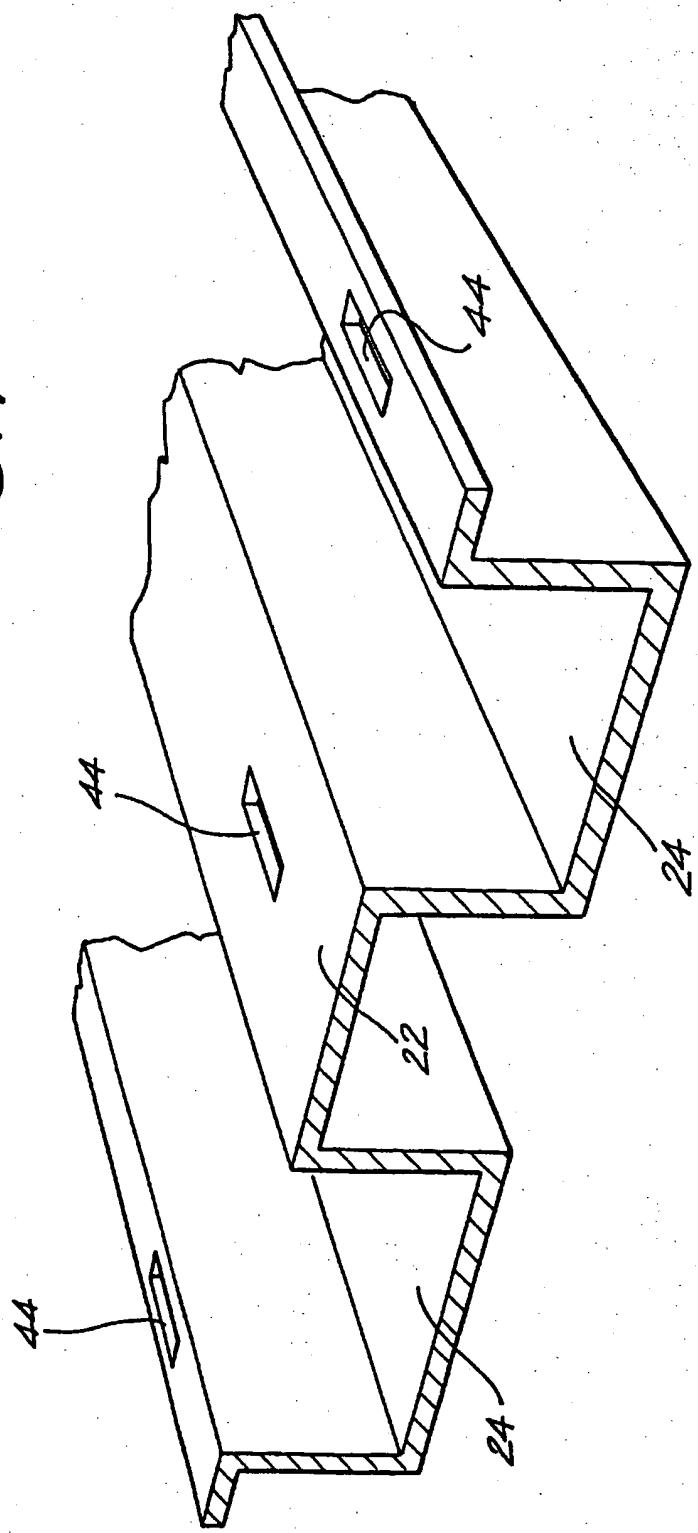


FIG. 7



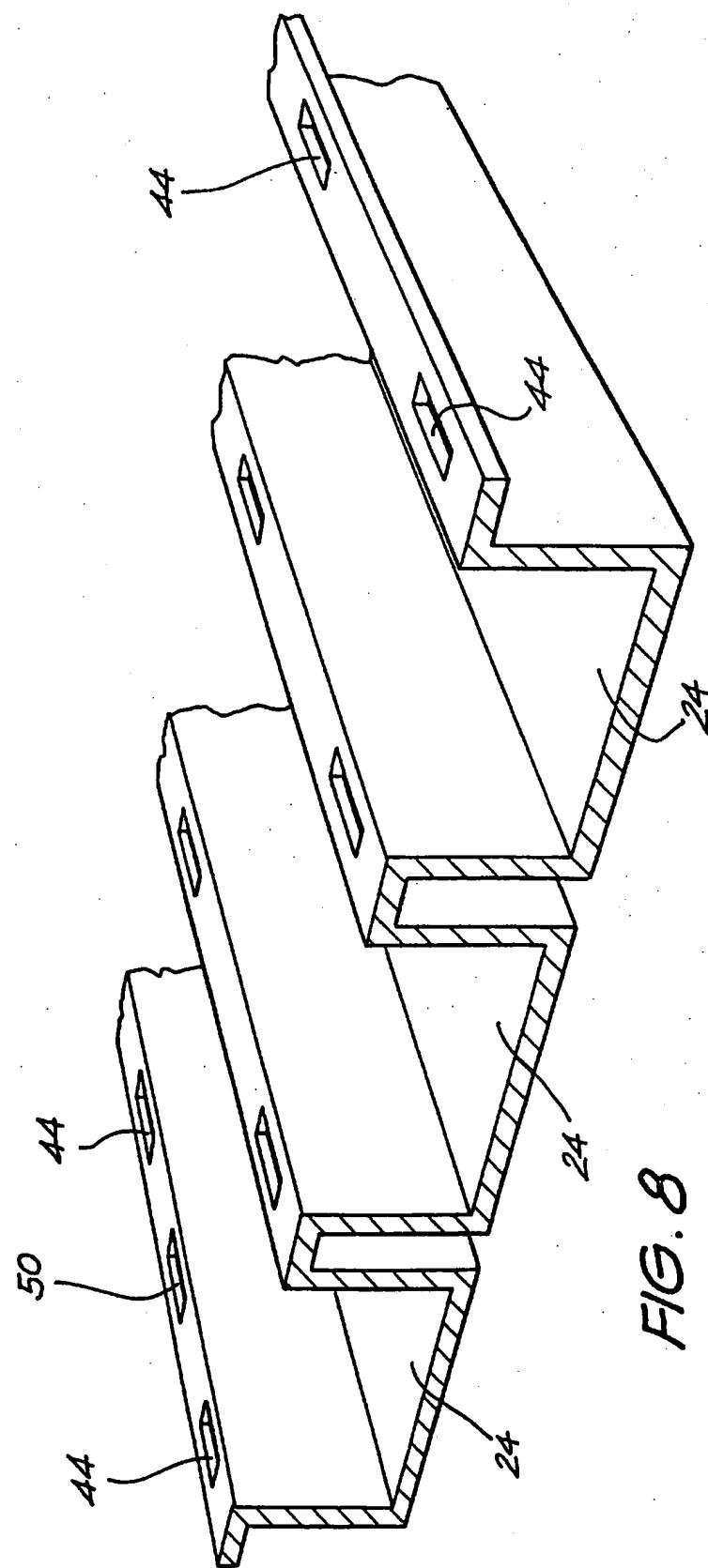
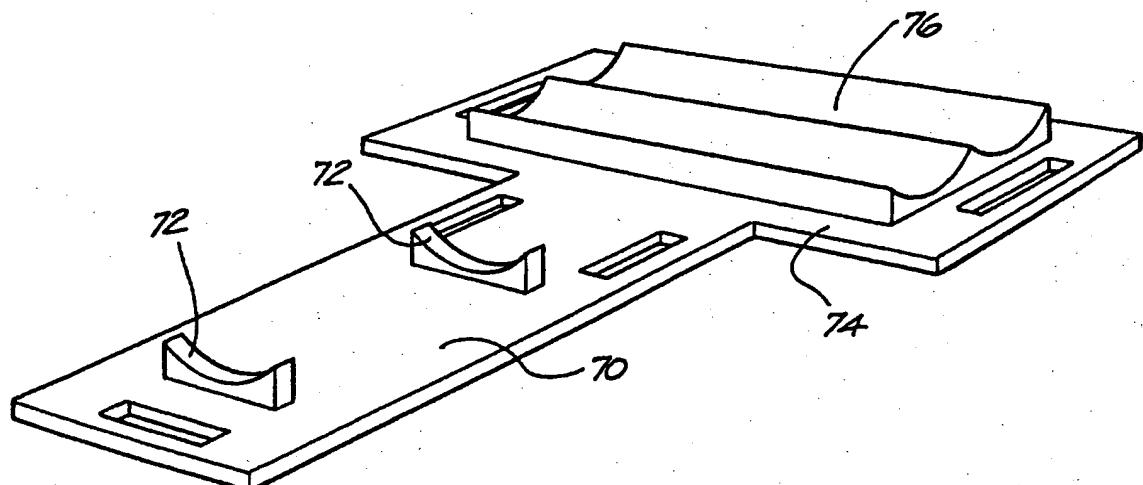
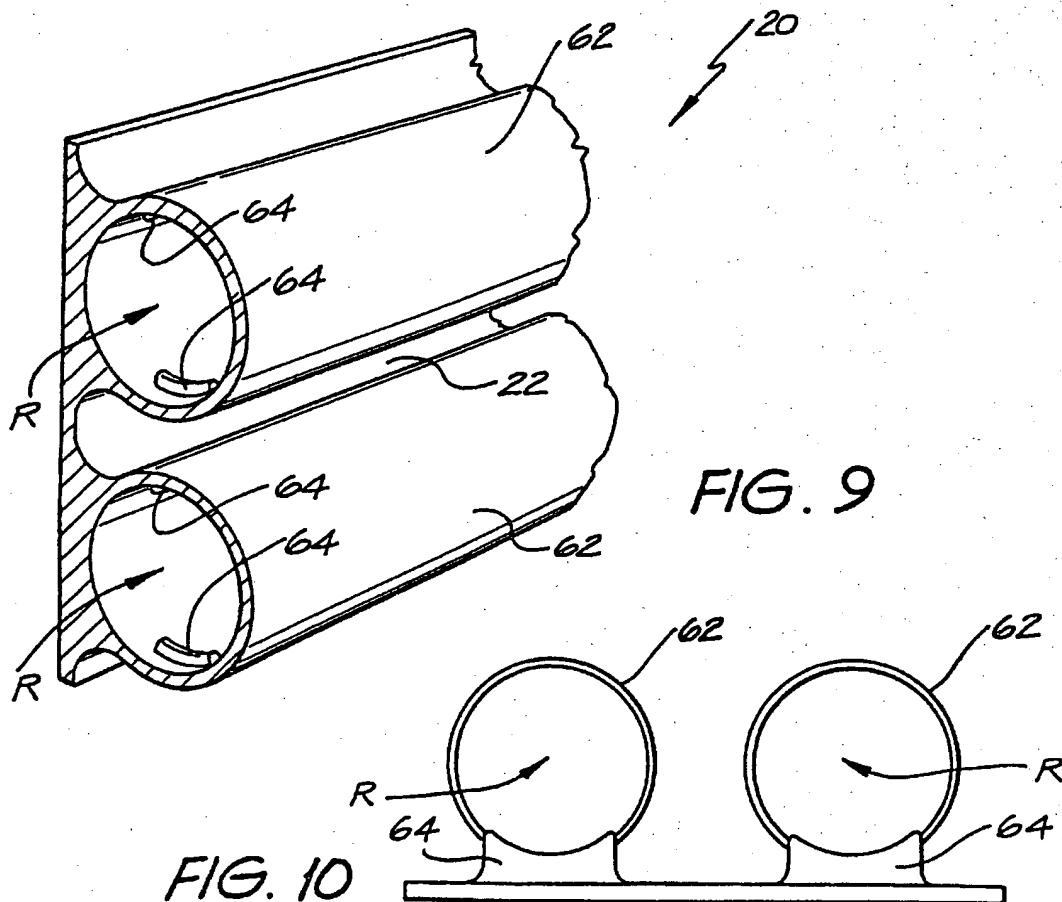


FIG. 8

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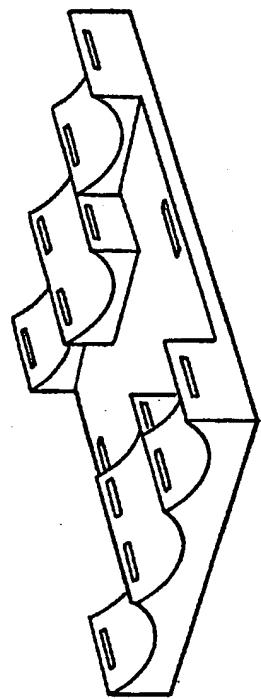


FIG. 13

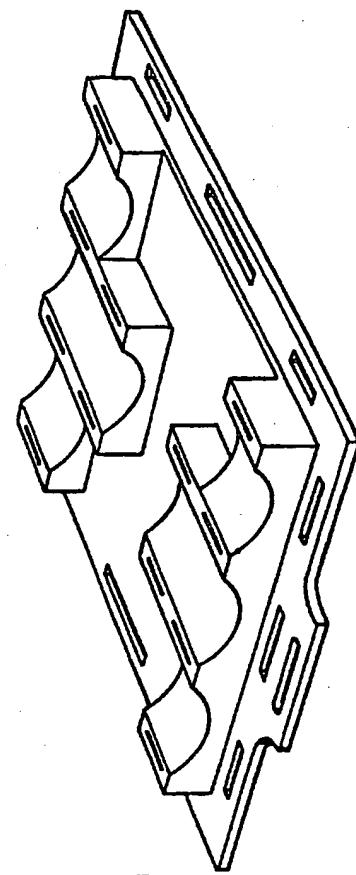


FIG. 15

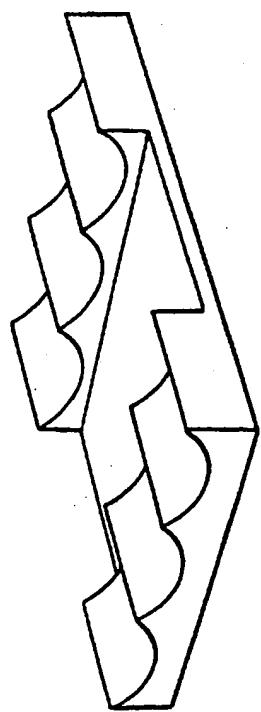


FIG. 12

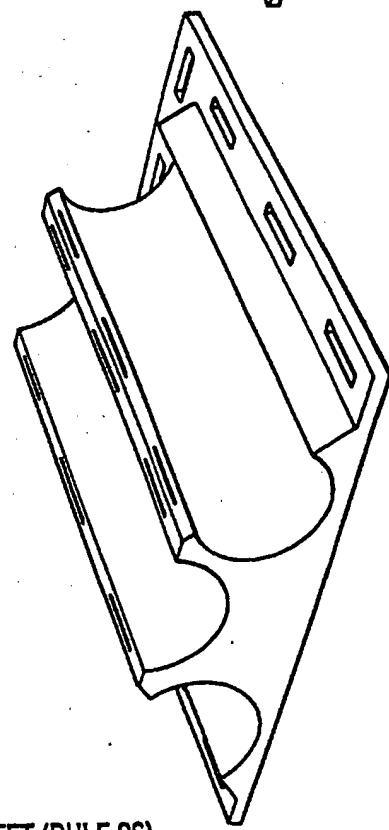
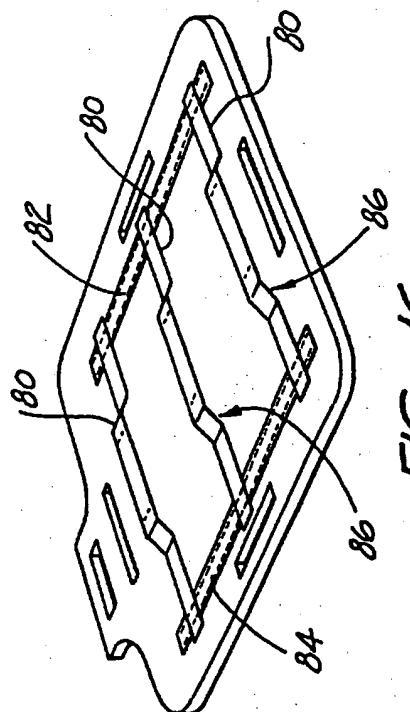
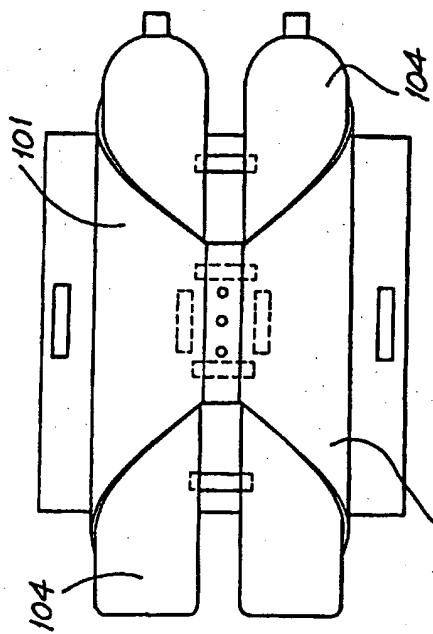
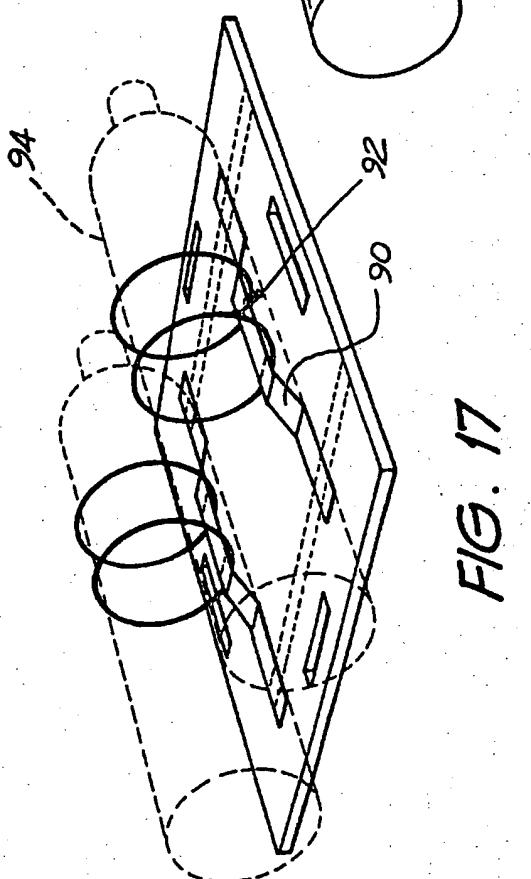
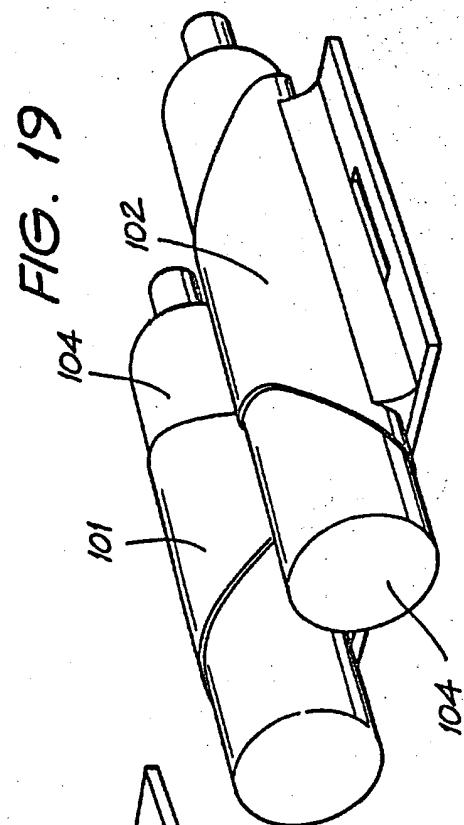


FIG. 14

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SUBSTITUTE SHEET (RULE 26)



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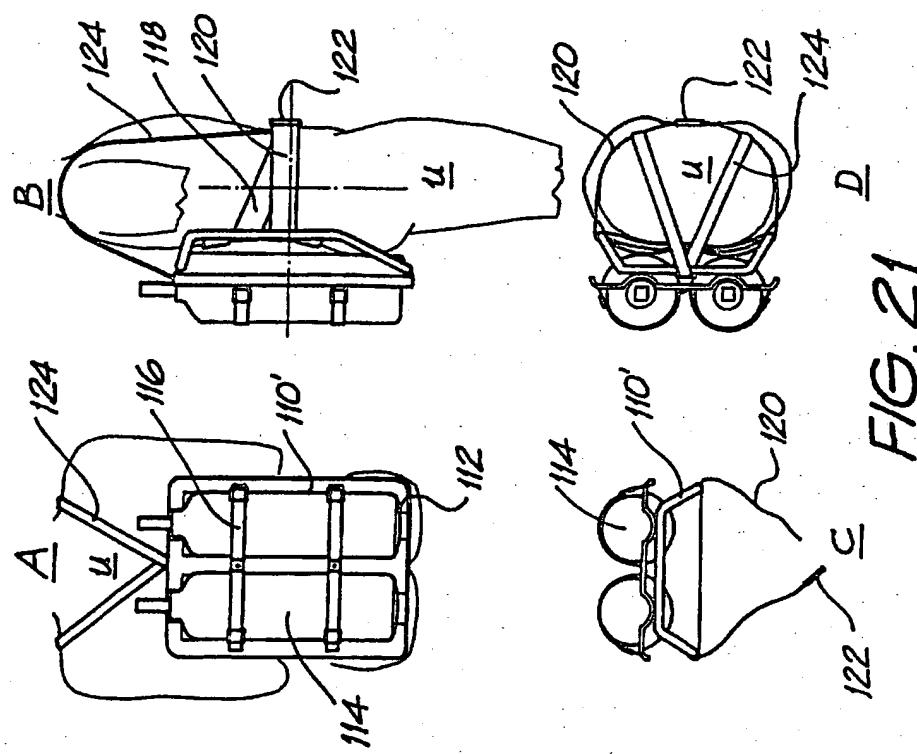


FIG. 21

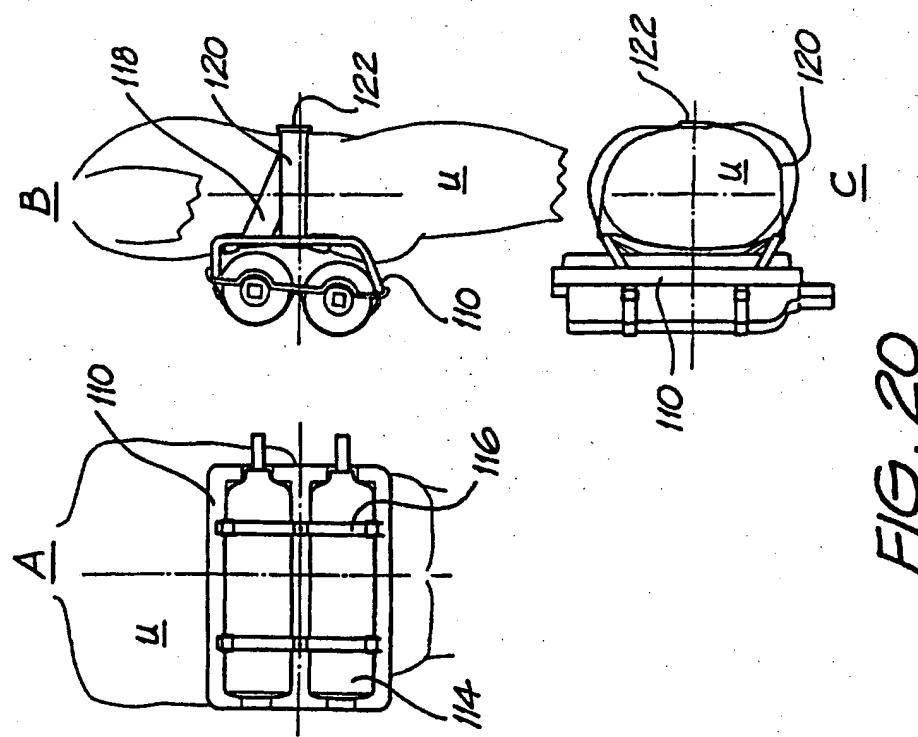


FIG. 20

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 95/00134

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.⁶ A45F 3/10, 3/14, 3/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: A45F 3/10, 3/14, 3/02Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU: IPC as above

Electronic data base consulted during the international search (name of data base, and where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
X	US.A, 3219242 (REILLY) 23 November 1965 See Figures	1-9
X	US.A, 2943775 (MACK) 5 July 1960 See Figures	1-8
X	US.A, 2675150 (ACKERMAN) 13 April 1954 See Figures	1-8

Further documents are listed
in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
 "E" earlier document but published on or after the international filing date
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) document referring to an oral disclosure, use, exhibition or other means
 "O" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

20 June 1995

Date of mailing of the international search report

11 July 1995 (11.07.95)

Name and mailing address of the ISA/AU

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